REMARKS

Claim status

Claims 28-52 were pending in the case at the time of the current Office Action. Claims 1-27 were previously cancelled. Claims 28, 38, 39, 46, and 48 are currently amended herein. Claims 28-52 are currently pending in the application.

Section 102 rejections

In the current Office action, claims 28-52 are rejected under 35 U.S.C. 102(b) as being anticipated by Merle (US 5,130,518), hereinafter Merle.

Applicants respectfully traverse the foregoing rejections in view of the above pending claims and for reasons set forth hereafter.

Merle concerns an electric welding apparatus for automatically welding heating coil fittings substantially of plastic material, for which a nominal welding work (i.e., energy), which is decisive for an optimum welding operation.

In the context of the claimed invention of the present application, Merle discloses, inter alia, to directly feed in the electric welding apparatus the nominal welding work (energy) (emphasis added) via scanning of a bar code at the fitting which includes data such as the nominal welding work. During a welding operation, in the controller of the welding apparatus, the scanned nominal welding work (energy) is compared with the respective actual welding work (energy) (emphasis added) and the welding operation is finished when the actual welding work has reached the nominal welding work. The actual welding work is obtained by an integrated circuit connected as effective value meter of the welding voltage and of the welding current to a calculator forming the welding capacity, i.e., actual welding power (P=UxI); whereby in the calculator, the effective values referred to are multiplicatively linked to obtain the actual welding power, which apparently by integration over the welding time leads to the actual welding work.

As a first aspect, Merle describes providing the welding apparatus with an ambient temperature gauge (sensor) (emphasis added) and a calculator which is fed, by the scanner via the converter, with the standardized nominal welding work data of the fitting and which feeds

signals of a temperature corrected nominal welding capacity (emphasis added) to the further input of the control. That is, in Merle, the standardized nominal welding work, which is referred to a particular reference temperature, is adjusted depending on the actual measured ambient temperature. (emphasis added)

As a second aspect, Merle describes configuring the welding apparatus such that the welding process does not start before the heating coil fitting connected has indeed a resistance value of the heating coil which is practically identical to the predetermined value. To this end, the scanner for scanning the fitting data detects, via the converter, data of the nominal resistance of the fitting related to a reference temperature of particularly 20°C as well as a temperature factor of the resistance and stores them in a storage. Correction and comparison means, which is connected to the ambient temperature gauge, is connected to the storage as well as to a resistance measuring circuit (emphasis added) connected to the fitting, compares the actual resistance measured therewith with the nominal resistance converted to the ambient temperature and, in case of deviation from a tolerance, triggers blocking means. That means that the welding process cannot start before it has been verified that the heating coil fitting is in order, i.e., has the resistance value predetermined and does not show any short-circuit or breakage. That is, from the point of view of the claimed invention of the present application, Merle merely discloses that the actual ohmic resistance of the heating coil is measured (emphasis added) as an electrical parameter of the heating coil.

Accordingly, a difference of the matter of Merle vis-à-vis the claimed invention of the present application is, inter alia, that Merle fails to disclose the particular element:

"measuring at least one electrical parameter of the heating coil fitting, wherein an inductance of the heating coil of the heating coil fitting is measured as a first electrical parameter". (emphasis added)

In fact, Merle is silent about any measuring or use of the inductance of the heating coil (emphasis added). That is, it is not correct that in Merle, the current of the coil is monitored and the inductance must be monitored based on the current measurement. The location cited in the current Office action (column 7, lines 5-25) does neither explicitly nor implicitly refer to a monitoring of the inductance of the heating coil. Furthermore, Merle does not mention the word "inductance" at all. Moreover, in Merle, the resistance, but not impedance, of the heating coil is

measured. Furthermore, Merle fails to consider a phase shift between the welding current and welding voltage. Therefore, a person skilled in the art would not obtain from Merle the idea to measure the inductance of the heating coil, nor to use the inductance value of the heating coil to determine an energy input correction factor.

In contrast to Merle, the claimed invention of the present application relates to determination of precise welding voltage settings for heating coils, i.e., an optimized welding energy input, when the fundamental frequencies of the AC welding voltages for the heating coil fittings are outside the established tolerance zone, especially for DC welding voltages. (emphasis added) Therefore, to optimize the welding energy input into the heating coil of a heating coil fitting, a welding voltage with an arbitrary fundamental frequency may be used (emphasis added), i.e., significant frequency deviations are permitted in comparison with the frequency tolerance of the established (nominal) welding voltage for the welding fitting. Thus, for instance, the claimed invention of the present application allows for using a DC voltage as welding voltage. Such a DC heating coil welder is best used with a mains power supply because the above-described negative impact on the grid is as good as non-existent.

However, the welding voltage may also be an AC voltage with a fundamental frequency outside the tolerance range for the established (i.e., nominal) AC welding voltage for the heating coil fitting. Such an AC voltage heating coil welder is particularly well suited for use with a generator as power supply for AC voltage, for example, with a frequency of 200 or 400 Hz, e.g., for the exempt use on construction sites.

According to the claimed invention of the present application, at least one or several electrical parameters for the heating coil fitting are measured for the implementation of the claimed invention, wherein the inductance of the heating coil is used as a first electrical parameter. (emphasis added) To ascertain optimized energy input into the heating coil fitting, the at least one or several electrical parameters of the heating coil fitting are then used to determine a correction factor for the energy input. (emphasis added) The correction factor is then used to adapt at least one welding parameter. (emphasis added)

As welding parameters may be set, either the effective welding voltage or the welding time, i.e., the duration for which the welding voltage is applied to the heating coil fitting; it is possible to adjust both parameters. The welding parameter(s) are adjusted individually for each

welding process. Thus, based on the electrical parameters for each individual heating coil fitting, the energy input is, therefore, optimized for each welding process.

The correction factor for the energy input (emphasis added) is defined by one single correction factor for one parameter or an arbitrary combination of single correction factors. A first single correction factor may be an inductance correction factor. In essence, this factor accounts for the additional influence on the welding energy input, which stems from the inductance of the heating coil in the heating coil fitting when the fundamental frequency for the welding voltage deviates from the preset tolerance range for the heating coil fitting. A second single correction factor may be a harmonics correction factor. In essence, this factor corrects for the welding energy input, which is due to the harmonic waves of an AC welding voltage when the fundamental frequency for the welding voltage deviates from the preset tolerance range for the heating coil fitting. A third single correction factor may be an ohmic resistance correction factor. In essence, this factor is meant to correct for the impact on the welding energy input, which results from the temperature dependency of the ohmic heating coil resistance in the heating coil fitting.

The amendments to independent claims 28 and 46 are intended to better reflect the fact that the at least one measured electrical parameter of the heating coil is the heating coil inductance (emphasis added), based on which at least one energy input correction factor is determined, by which the energy input to the heating coil is regulated.

Therefore, in view of at least the foregoing, it is respectfully submitted that independent claims 28 and 46 are not anticipated by Merle, and it is respectfully submitted that independent claims 1 and 46 define allowable subject matter. Also, since claims 29-45 and 47-52 depend either directly or indirectly from claims 1 and 46, it is respectfully submitted that claims 29-45 and 47-52 define allowable subject matter as well. Applicants respectfully request that the rejection of claims 28-52 under 35 U.S.C. 102(b) be removed.

Accordingly, the applicant respectfully requests reconsideration of the rejections and objections based on at least the foregoing. After such reconsideration, it is urged that allowance of claims 28-52 will be in order.

Respectfully submitted,

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